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Europäisches Patentamt
European Patent Office
Office européen des brevets



11 Publication number:

0 207 726 B1

12

EUROPEAN PATENT SPECIFICATION

45 Date of publication of patent specification: **12.02.92** 51 Int. Cl.⁵: **A61B 10/00**

21 Application number: **86304905.2**

22 Date of filing: **25.06.86**

54 **Biopsy device.**

30 Priority: **03.07.85 US 752342**

43 Date of publication of application:
07.01.87 Bulletin 87/02

45 Publication of the grant of the patent:
12.02.92 Bulletin 92/07

84 Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

56 References cited:
EP-A- 0 153 047
FR-A- 2 389 365
US-A- 3 989 033
US-A- 3 995 619

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Description

This invention relates to biopsy devices.

Some biopsy devices as disclosed for instance in FR-A-2 389 365 include a tubular cutting element or needle or cannula having a body tissue cutting distal end, and a stylet slidable in the cannula and having a pointed distal end for piercing tissue and a cavity for receiving tissue to be sampled. In using such a device, the stylet and cannula are relatively positioned so that the distal end of the cannula covers the cavity and closely surrounds the distal end of the stylet to prevent the coring of tissue during insertion into the patient. In one method of using such device, the stylet and cannula are inserted to a position either in the tissue from which a sample is to be taken or to a point adjacent such tissue. The cannula may then be held stationary with one hand, while the stylet is moved distally with the other hand so that the distal end and the cavity of the stylet move into tissue from which a sample is to be taken. Next, the stylet is held stationary with one hand while the cannula is moved distally thereby cutting tissue that has moved into the cavity. With the tissue sample within the cavity and covered by the cannula, the stylet and cannula are removed from the patient. The body tissue sample may then be removed from the biopsy device for testing purposes.

The above procedure is somewhat complicated and there is the danger of inadvertently moving the wrong member at the wrong time. Because the two members are at times moved together and other times moved relative to each other in performing the biopsy, the person performing the biopsy may inadvertently fail to use the proper sequence of movements or steps in effecting the above procedure. This can, in some cases, result in damage to the patient or failure to obtain a sample thereby requiring a second insertion.

The document EP-A-0 153 047 which forms part of the state of the art under Article 54(3) and (4) only discloses a biopsy device comprising a housing having two manually operable actuators slidable therein, and operatively connected one to the needle and the other to the stylet. Only one of these actuators extends proximally of the housing, the other extending in the perpendicular direction.

With some biopsy devices it is possible to inadvertently insert the cannula and stylet into tissue while the cannula cutting tip is distally of the stylet tip and this would result in damage to tissue due to coring.

According to the invention there is provided a biopsy device comprising a tubular needle with a distal cutting tip and a stylet slidable in the needle, the stylet having a cavity near the distal end thereof to receive a tissue sample in use, wherein there

is provided a housing having two manually operable actuators slidable therein and operatively connected one to said needle and one to said stylet, the actuators extending proximally of the housing and the needle and stylet extending distally of the housing.

The device provides a convenient hand held assembly in which the actuators can be manually operated to adjust the relative positions of the needle and stylet to perform the biopsy. Graduations may be provided on the actuators to indicate the relative position of the needle and stylet. A snap-on hand grip may be provided which depends from the housing and is arranged to position the users thumb adjacent the proximal end of the actuators for one handed operation of the biopsy device. This arrangement leaves the users other hand free to steady the patient and guide the needle and stylet.

In a preferred embodiment abutment means are provided to limit movement of the actuators proximally of the housing and detent means may be provided to releasably retain the actuators at the maximum proximal extension. The abutment for each actuator is arranged such that the relative position of needle and stylet is suitable for insertion into the patient, that is with the stylet tip just protruding from the needle. In this way the user can be certain that the device is ready for use. The detent means provides additional reassurance that the device is in a ready for use condition.

Preferably the actuators have the same maximum proximal extension. This gives yet further reassurance that the device is in a ready to use condition and places both actuators in position to be actuated sequentially by the users thumb.

The device may also be provided with abutment means to limit movement of said actuators distally of the housing. This arrangement ensures that the user knows when the biopsy sample has been taken and the abutment for each actuator is arranged such that the relative position of the needle and stylet is in the starting condition and ready for withdrawal from the patient.

The abutment means may comprise an axially extending groove in the wall of the housing and a co-operating resiliently loaded tongue of an adjacent actuator biased into the groove and engageable with one or other end walls of the groove to provide an abutment. The tongue is in the nature of a cantilever spring with an upstanding projection at the free end. The detent means may comprise a second adjacent projection such that the projections engage the end wall of the groove. In a preferred embodiment the housing has opposite grooves, each actuator having a tongue biased into a respective groove.

Co-operable abutment means may also be pro-

vided between the actuators to ensure that the needle cannot be advanced over the stylet tip. Such abutment means may also limit maximum protrusion of the stylet tip to ensure that the sample cavity is exposed but that the portion of the stylet proximal to the cavity remains in the needle.

Clearly the arrangement of abutments within the device can be varied so long as the relative positions of the stylet and needle are confined to a restricted range. For example an abutment on the housing to limit proximal movement of the stylet actuator may not be necessary where the co-operating abutment between the actuators ensures that movement of the needle actuator to the maximum proximal extension also moves the stylet actuator to the same position. Abutment may also be provided by end walls of the housing.

Other features of the invention will be apparent from the following description of a preferred embodiment shown by way of example only in the accompanying drawings in which:-

Figure 1 is an axial section through a biopsy device in accordance with a preferred embodiment of the present invention;

Figure 2 is an axial section similar to Figure 1 but with the biopsy device in a different operating condition;

Figure 3 is a section similar to Figure 1 but with the biopsy device of Figure 1 in still another operating condition;

Figure 4 is a left end view of the device of Figure 1;

Figure 5 is an elevation of the cannula member of the biopsy device of Figure 1;

Figure 6 is a right end view of the cannula member of Figure 5;

Figure 7 is a view of the inner face of the cannula member shown in Figure 5;

Figure 8 is a view of the inner face of the stylet member of the biopsy device of Figure 1;

Figure 9 is an elevation of the stylet member of Figure 8;

Figure 10 is a right end view of the stylet member of Figure 9;

Figure 11 is a plan view of the housing of the biopsy device of Figure 1;

Figure 12 is a left end view of the housing of Figure 11;

Figure 13 is a right end view of the housing of Figure 11;

Figure 14 is an axial section through the housing of Figure 11;

Figure 15 is an enlarged fragmentary view of the distal end portions of the stylet and cannula of Figure 1 rotated 90°;

Figure 16 is an enlarged fragmentary view of the distal end portions of the stylet and cannula of Figure 2 rotated 90°;

Figure 17 is an enlarged bottom view of the distal end portion of the stylet of Figure 1;

Figure 18 is a plan view of the biopsy device of Figure 1 but with the housing positioned to taking a tissue sample of smaller length;

Figure 19 is a plan view similar to Figure 18 but with the stylet and cannula members in a different operating condition;

Figure 20 is an elevation of the biopsy device shown in Figure 19;

Figure 21 is an elevation of the biopsy device of Figure 1 on a reduced scale and connected with a handle;

Figure 22 is a fragmentary right end view of the handle of Figure 21 with the biopsy device removed; and

Figure 23 is a fragmentary plan view of the handle of Figure 21 with the biopsy device removed.

Referring now to the drawings and more particularly to Figures 1 to 4, a biopsy device 10 is shown including a tissue cutting member 12, a tissue piercing stylet member 14, and a housing 16 receiving the cutting and stylet members 12 and 14 for predetermined sliding movement relative to each other and to the housing 16. The cutting and stylet members are shown in three different relative conditions of operation in Figures 1, 2 and 3, which conditions occur during the taking of a biopsy sample. As shown in Figure 4, the proximal end of cutting member 12 is labelled with the word "Cut" to ensure proper identification during use of the biopsy device.

As shown also in Figures 5 to 7, the cutting member 12 includes a tubular cutting element or needle or cannula 18, for example, a stainless steel cylindrical tube having a lumen 19 and a distal cutting end or tip 20. Cutting end 20 is shown pointed and bevel sharpened entirely around the tip for cutting body tissue. The proximal end of cannula 18 is connected to a longitudinally extending actuator 22. Actuator 22 includes a distal end connecting portion 24 which extends normally from the actuator and longitudinal axis of the cannula 18. The proximal end of cutting element 18 is shown extending through the connecting portion 24 and slightly beyond the proximal side of portion 24. Cannula 18 may be fixed to portion 24 by an adhesive such as a cured epoxy resin or by other suitable means.

Actuator 22 has opposed parallel walls 26 and 28, and an outer sidewall 30 effecting a channel 29. At the proximal end of the actuator is a radially outwardly extending flange 32 having a flat proximal side. Sidewall 30 has a pair of longitudinally extending slots 33 and 34 and a cross slot 35 interconnecting slots 33 and 34 to provide a resilient or spring arm 36. Resilient arm 36 is provided

with an abutment 38 at the distal end which serves as a stop and which may be generally rectangular as shown. Spaced a small distance proximally of abutment stop 38 is a radially outwardly extending rounded bump 40. On the opposed sides 26 and 28 there is provided a pair of abutment stops 42 and 44, respectively, which are adapted to limit relative longitudinal movement between the cutting member 12 and stylet member 14 as will be discussed hereafter.

The stylet member 14, as seen also in Figures 8 to 10, includes an elongate stylet 46 having a pointed sharp distal end 47 for piercing body tissue. The proximal end of needle 46 is connected to a needle actuator 48. Actuator 48 has an inwardly extending distal end portion 49 to which the stylet 46 is fixed, such as by a cured epoxy resin or by other suitable means. Actuator 48 includes parallel walls 50 and 51 respectively, and an outer sidewall 52 connecting the walls 50 and 51 so as to form a channel. Wall 52 includes a pair of longitudinally extending slots 54 and 56 and a distal end cross slot 57 connecting slots 54 and 56 to form a resilient spring-like member 58. The resilient member 58 has an integral, rectangular abutment or stop 60 and a bump 62 spaced slightly proximally of the abutment 60. Actuator 48 also has a flange 64 extending in the opposite direction from that of flange 32 of cutting member 12 as viewed in Figures 1 to 3. Flange 64 also has a flat proximal side. The stylet 46 has a longitudinally extending groove or cavity 66 in the sidewall of the needle which is adapted to receive body tissue to be sampled. Stylet 46 is solid and circular in cross-section and is sized to be slidably received in the lumen 19 of cannula 18 as shown in Figures 1 to 3. The stylet is preferably made of stainless steel.

Housing 16, as also seen in Figures 11 to 14, has longitudinally extending sidewalls 67 and 68, and opposed sidewalls 69 and 70 providing a longitudinally extending chamber 72 for receiving the tissue cutting and stylet members 12 and 14. The housing 16 is generally rectangular in cross-section and completely encircles or surrounds the cutting and stylet members. The housing has a flange 74 at the proximal end and a flange 76 at the distal end which extend entirely around the housing as best seen in Figures 12 and 13. Sidewalls 69 and 70 have a pair of grooves 78 and 80, respectively, which extend distally from flange 74. Groove 78 has proximal and distal end walls 81 and 82 which form stops engageable to stop 38 on the cutting member 12 to limit movement of the cutting member in both distal and proximal directions of movement. The groove 80 in wall 70 has proximal and distal end walls 83 and 84 which serve as stops for abutment stop 60 on stylet 14 to limit similar movement thereof. On the inner sides of walls 67 and 68

of the housing are a pair of rails 85 and 86, respectively, on which the actuators 22 and 48, respectively, slide when the cutting and stylet members 12 and 14 are moved in the housing. Housing 16 is also provided with a collar 87 at the distal end thereof which has a passage 88 connected with the chamber 78 to closely receive the cannula 18 in sliding relation.

As best seen in Figures 15 and 16, the cavity 66 of stylet 18 is spaced from but near the distal end or tip 47 of the stylet. The cavity 66 has opposed proximal and distal end walls 89 and 90 and may be formed by grinding or the like. When the cannula 18 is in its distal or forward most position with respect to the stylet 46, as in Figure 1 and Figure 15, the cannula completely covers the cavity 66 with the tip 20 of the cannula on a cylindrical distal end portion 91 of the stylet. With the cannula 18 and stylet 46 relatively positioned as in Figure 1, they can be inserted into a desired location in the body tissue without coring tissue during the insertion. Figure 16 shows the cannula 18 retracted or in its most proximal or rearward position with respect to the stylet 46 so that the cavity 66 is fully uncovered and the cannula is surrounding a cylindrical portion of the stylet which is proximal of the cavity. The outer surface of the bottom wall of the cavity 66 is arcuate or rounded as shown in Figure 17.

When assembling the biopsy device 10, the distal tip 47 of stylet 46 is inserted into the proximal end of lumen 19 of cannula 18 and such that the guide 49 of the stylet actuator 48 enters the channel 29 of the cannula actuator 48. The stylet 46 may be moved distally in cannula 18 while slightly bending the stylet to allow the stylet guide 49 to move beyond the stops 42 and 44, without effecting a permanent bend in the stylet. Alternately, the guide 49 may be positioned on the proximal side of the stops 42 and 44 and pushed distally through the stops where the stops are inclined as shown (Figure 7) and the walls 26 and 28 of actuator 22 are somewhat resilient. With stylet 46 within the cannula 18, the two are inserted into the proximal opening of housing 16 and through the distal opening 88 (Figure 14) with the actuators entering the housing and with the housing rails 85 and 86 between the actuators. Next, the resilient spring members 36 and 58 may be pinched toward each other to move the abutments 38 and 60 inwardly past the housing end abutments 81 and 83. When released, the cannula and actuator members 12 and 14 are slidably disposed in housing 16 with the guide 49 entering the channel 29 of the cannula actuator and being longitudinally slidable.

In the assembled biopsy device 10, the cannula and stylet members 12 and 14 are limited in

movement in the proximal direction by the engagement of the actuator stops 38 and 60 with the housing stops 81 and 83, respectively, as in Figure 1. In Figure 1 the members 12 and 14 are in the fully retracted or maximum proximal or rearward position. Also, in the fully retracted position, the stops 42 and 44 (Figure 7) on the cannula actuator 22 are engaged by the stops 43 and 45 (Figure 8) on the stylet actuator 48.

The movement of the cannula and stylet member 12 and 14 in the distal direction is limited by the engagement of the actuator stops 38 and 60 with the housing stops 82 and 84, respectively. Members 12 and 14 are shown in Figure 3 in the maximum distal or extended position.

The stylet actuator stops 43 and 45 (Figure 8) co-operate with the cannula actuator stops 42 and 44, respectively, to limit proximal movement of the stylet actuator relative to the cannula actuator to positively prevent the cannula tip 20 from moving distally of the distal tip 47 of the stylet 46. This ensures that the operator cannot, under any circumstance, insert the device 10 into body tissue with the cannula tip distally of the stylet tip.

Whenever the actuators are positioned such that the actuator flanges 32 and 64 are substantially equidistant from the flange 74 of housing 16, such as shown in Figures 1 and 3, the cannula 18 covers the cavity 66 of the stylet as best seen in Figure 15. Thus, the operator of the device 10 will readily know when the device can be inserted into a patient without coring tissue.

In operation, preparatory to insertion of the device 10 into the tissue of a patient, indicated at 94, the cannula and stylet members 12 and 14 are retracted or moved to their most proximal positions as shown in Figure 1. In this condition, the friction bumps 40 and 62 of the actuators engage the proximal end of housing flange 74 to resist inadvertent distal movement of the actuators relative to the housing. In this condition, the cavity 66 is covered by the cannula 18. Since the walls of the actuators are slightly flexible, such resistive forces due to the bumps are overcome when manual forces are applied to the members to urge them into the housing 16.

With the members 12 and 14 positioned as shown in Figure 1, the housing 16 may be grasped by the hand to move the distal tips 20 and 47 of the members 12 and 14 into the patient and up to that area of the body from which a sample is to be taken, such as indicated at 96 (Figure 18). When the biopsy device is properly positioned in the patient, the housing may be held stationary with one hand while the stylet actuator 48 is moved distally to its full distal position as shown in Figures 2, 19 and 20 wherein the stop 60 engages housing stop 84 at the distal end of housing groove 80.

During this movement, the cannula 18 and housing 16 remain stationary while the stylet 46 is moved distally relative to the cannula and into the tissue material from which a sample is to be taken. The engagement between the bump 40 and proximal end of housing 16 prevents any inadvertent movement of the cannula actuator at this time. In the position shown in Figure 2, tissue material from which a sample is to be taken will extend into the cavity 66 and the condition of the cannula and stylet will appear as in Figure 16, that is, with cavity 66 fully open. Next, while still holding the housing stationary in the same hand, the cannula actuator 22 is moved distally from its position in Figure 2 to its position in Figure 3, that is, to its full distal position wherein the cannula actuator stop 38 engages stop 82 at the distal end of the housing groove 78. During this movement the cutting end 20 of the cannula 18 cuts sample material that extends into the cavity 66 and returns the cannula 18 and stylet 46 to the positions indicated in Figure 15 but now the cavity 66 will contain the severed tissue sample (not shown). The biopsy device 10 is then removed with the sample being maintained in the cavity 66 by the cannula 18. The cannula 18 may then be retracted or moved proximally relative to the stylet to open the cavity 66 and permit removal of the tissue sample for test purposes.

Because of the use of housing 16, the operation of the device 10 is simple and the risk of operating errors and inadvertent damage to the patient is reduced. Since housing 16 may be held stationary with one hand after the insertion of the device 10 into the patient, the housing provides a stable reference point with respect to the patient and for the subsequent movements of the cannula and stylet members 12 and 14 in properly obtaining the desired tissue sample. This method and operation of device 10 is simple in that after initial insertion of the device 10 while in the condition shown in Figure 1, both actuators 22 and 48 are manually pushed forward, first the stylet actuator 48 and then the cannula actuator 22.

The biopsy device 10 may be operated in a somewhat different manner from that previously described herein. For example, the actuators 22 and 48 may be initially moved fully forward or to their most distal positions as shown in Figure 3, and while holding the actuators in these positions, inserting the cannula and stylet fully into the tissue to be sampled such as shown in Figure 3. Then, while maintaining the housing 16 and stylet 48 stationary, the cannula actuator 22 is moved proximally to its most proximal position such as to the position shown in Figure 2. By moving the cannula in the proximal direction, the cavity 66 is exposed to allow tissue to enter the cavity. The next step is to move the cannula actuator 22 forward or distally

while maintaining the stylet 46 and housing stationary to thereby cut body tissue and trap it in the cavity 66 of the stylet. While so trapped, the biopsy device is removed from the patient. This method is also simple since only cannula actuator 22 is moved after the device is inserted, that is, actuator 22 is first moved proximally to open the stylet cavity 66 and then it is moved distally to effect the cutting of the tissue.

In both of the above described procedures, the housing, after the device is initially inserted into the patient, remains stationary to limit the movements of the actuators in obtaining the desired biopsy specimen and to provide a stable reference point for indicating the relative positions of the cannula and stylet when in the patient.

The biopsy device 10 may also be used to remove a biopsy specimen of smaller length than that obtained by the above two procedures. For example, with the biopsy device in the condition shown in Figure 1, that is, with the cannula and stylet members 12 and 14 in the fully retracted or most proximal positions, the device is inserted into the patient to a point adjacent the tissue from which a sample is to be taken. After insertion and while holding the actuators 22 and 48 stationary, the housing 16 is moved a selected amount proximally relative to the actuators. A scale 98 (Figures 5, 18 and 19) is provided on the cannula actuator 22 to indicate the amount of movement of the housing from its position in Figure 1 to its position in Figure 18. For example, the scale may be in millimeters. Next, while maintaining the housing 16 and cannula actuator 22 stationary, the stylet actuator 48 is moved proximally into housing 16 as far as it will go, such as shown in Figure 19. The distal advancement of the stylet actuator 22 is stopped as a result of the engagement between the housing stop 84 and stylet actuator stop 60. Since the housing 16 had been moved proximally, the advancement of the stylet actuator 22 relative to the cannula actuator 22 is reduced. This means that the length of the cavity uncovered by the cannula 18 (Figure 19) is less than the full length of the cavity and is represented by the position of the housing flange 74 on the scale 98. With the device 10 in the condition shown in Figures 19 and 20, the cannula actuator 22 is moved distally until it is stopped by the engagement between stop 38 on cannula actuator 22 and stop 82 on housing 16. This latter movement of the cannula cuts the body tissue and closes cavity 66 so that the device 10 may be removed from the patient along with the sample. In this case, the length of the sample will be less than that obtained when the full length of the cavity 66 is used to receive sample tissue.

Figures 21 to 23 illustrate an embodiment in which the biopsy device 10 is connected to a hand

grip 100 so that the device 10 may be readily used with one hand thereby freeing the other hand for other work. Hand grip 100 includes an elongate platform 102 which supports the housing 16. The platform extends between the housing flanges 74 and 76 to provide a tight fit therebetween. The platform 102 includes a flat bottom supporting wall 104, a pair of opposed sidewalls 106 and 108 which respectively engage the opposed sides 69 and 70 of the housing. These sidewalls 106 and 108 are curved as seen in Figures 22 and 23 so as to extend slightly over the upper wall 67 of the housing to firmly hold the housing in place on the platform. At the distal end of platform 102 are a pair of integral upstanding walls 110 and 112 that engage the proximal side of the housing flange 76. Connected to the platform is a depending handle 114 adapted to be gripped by the hand. In this way, the handle 114 may be gripped by the hand and the thumb used to operate the actuators 22 and 48 from the proximal end of the device 10. The handle 114 has a flat, relatively thin web 116 with a wider peripheral border 118. The border widens near platform 102 to form a thumb rest area indicated at 120. The plane of the web 116 is closer to the plane of sidewall 106 than to the plane of sidewall 108 to allow a more natural and comfortable positioning of the thumb.

The hand grip 100 is preferably a single piece moulded plastic member of relatively rigid plastic. The plastic should be flexible enough to allow the housing 16 to be manually inserted onto the platform 104 when forced between the sidewalls 106 and 108. These sidewalls should be resilient enough to firmly grip the housing during use. The handle 100 and device 10 may be assembled by first forcing the narrow distal portion of housing 16 between the resilient walls 106 and 108 of the handle. Then the housing 16 may be moved distally until the housing flange 76 passes the distal end of the platform 102. The sidewalls then resiliently engage the enlarged proximal portion of the housing.

The device 10 may be removed from the handle 100 by holding housing flange 76 stationary with one hand and gripping handle 100 by the other hand. Then, forcing the distal end of platform 102 downwardly and angularly away from the housing 16, that is, tilting the distal end of the platform 102 downwardly and away from the distal end of the housing. As the platform moves angularly away from the housing, the wider portion of the housing is forced through the resilient sidewalls 106 and 108 of the handle to free the device 10. The handle 100 may be repeatedly used with different medical devices such as other biopsy devices similar or identical to device 10.

The actuators 22 and 48, the housing 16, and

the hand grip 100 may be formed or moulded of a relatively rigid plastic such as an acrylonitrile butadiene styrene (ABS), a polycarbonate, a polysulphone or other similar plastic.

When operating the device 10 with the handle 100 attached, the steps and movements of the parts may be the same as those previously described herein.

The housing 16 as constructed and shown is symmetrical so that the actuators 22 and 48 can be assembled with housing 16 even when the housing is rotated 180° on its longitudinal axis from the orientation shown in the drawings.

Claims

1. A biopsy device comprising a tubular needle (18) with a distal cutting tip and a stylet (46) slidable in the needle, said stylet having a cavity (66) adapted to receive a tissue sample; wherein there is provided a housing (16) having two manually operable actuators (22, 48) slidable therein and operatively connected one to said needle (18) and one to said stylet (46), said actuators extending proximally of the housing, and said needle and stylet extending distally of the housing.
2. A device according to Claim 1, wherein co-operable abutments (42 to 45) are provided between said actuators (22, 48), said abutments being adapted to prevent movement of the tip of said needle (18) distally of the tip of said stylet (46).
3. A device according to Claim 1 or Claim 2, wherein abutment means are provided to limit movement of said actuators (22, 48) proximally of the housing.
4. A device according to Claim 3, wherein detent means (38, 40; 60, 62) are provided to releasably retain said actuators (22, 48) at the maximum proximal extension.
5. A device according to Claim 3 or Claim 4, wherein the maximum proximal extension of said actuators (22, 48) is equal.
6. A device according to any preceding claim, wherein abutment means (38, 82; 60, 84) are provided to limit distal movement of said actuators (22, 48) relative to the housing.
7. A device according to Claim 6, wherein the minimum proximal extension of said actuators (22, 48) is equal.

8. A device according to any one of Claims 3 to 7, wherein said abutment means includes a co-operable abutment between said actuators.

9. A device according to any one of Claims 3 to 8, wherein said abutment means includes a co-operable abutment between one of said actuators and said housing.

10. A device according to Claim 9, wherein said housing (16) includes an axially extending groove (78) in the wall thereof, said groove having proximal and distal end walls (81, 82), and said one actuator (22) having a tongue (36) resiliently biased into said groove (78) and engageable with one or both of said end walls to limit movement of said one actuator.

11. A device according to Claim 10, wherein said housing has opposite grooves (78, 80) each actuator having a tongue biased into a respective groove.

12. A device according to Claim 1, wherein abutment means are provided to limit proximal and distal movement of said actuators relative to said housing, the abutment means being arranged to prevent movement of the distal tip of said needle distally of the distal tip of said stylet.

13. A device according to any preceding claim, wherein the length of said needle and stylet is such that in use the distal end of the needle covers said cavity and is proximal of the tip of the stylet when the proximal ends of said actuators are equidistant from the housing.

14. A device according to any preceding claim, wherein said housing is provided with a handgrip (100) depending therefrom and arranged to present in use the users thumb in a position to urge said actuators distally.

15. A device according to Claim 14, wherein the handgrip is removable.

Revendications

1. Appareil de biopsie comprenant une aiguille tubulaire (18) avec une extrémité de coupe distale et un stylet (46) pouvant coulisser dans l'aiguille, le stylet présentant une cavité (66) propre à recevoir un échantillon de tissu, dans lequel est prévu un corps (16) comportant deux actionneurs à main (22, 48) pouvant coulisser dans ce corps et reliés activement, pour l'un, à l'aiguille (18) et, pour l'autre, au stylet

(46), les actionneurs s'étendant dans le sens proximal du corps et l'aiguille et le stylet s'étendant dans le sens distal de ce corps.

2. Appareil suivant la revendication 1, dans lequel des moyens d'arrêt coopérants (42 à 45) sont prévus entre les actionneurs (22, 48) pour empêcher le déplacement de l'extrémité de l'aiguille (18) dans le sens distal de l'extrémité du stylet (46). 5 10
3. Appareil suivant la revendication 1 ou 2, dans lequel des moyens d'arrêt sont prévus pour limiter le déplacement des actionneurs (22, 48) dans le sens proximal du corps. 15
4. Appareil suivant la revendication 3, dans lequel des moyens à déclic (38, 40; 60, 62) sont prévus pour retenir de manière détachable les actionneurs (22, 48) au maximum de leur extension proximale. 20
5. Appareil suivant la revendication 3 ou 4, dans lequel le maximum d'extension proximale des actionneurs (22, 48) est le même. 25
6. Appareil suivant l'une quelconque des revendications précédentes, dans lequel les moyens d'arrêt (28, 82; 60, 84) sont prévus pour limiter le déplacement distal des actionneurs (22, 48) par rapport au corps. 30
7. Appareil suivant la revendication 6, dans lequel le minimum d'extension proximale des actionneurs (22, 48) est le même. 35
8. Appareil suivant l'une quelconque des revendications 3 à 7, dans lequel les moyens d'arrêt comprennent un arrêt coopérant entre les actionneurs. 40
9. Appareil suivant l'une quelconque des revendications 3 à 8, dans lequel les moyens d'arrêt comprennent un arrêt coopérant entre l'un des actionneurs et le corps. 45
10. Appareil suivant la revendication 9, dans lequel le corps (16) comprend une rainure axiale (78) dans sa paroi, cette rainure présentant des parois d'extrémité proximale et distale (81, 82) et ledit actionneur (22) présente une languette (36) sollicitée élastiquement dans la rainure (78) et pouvant être engagée avec l'une et/ou l'autre des parois d'extrémité pour limiter le déplacement dudit actionneur. 50 55
11. Appareil suivant la revendication 10, dans lequel le corps présente des rainures opposées

(78, 80), chaque actionneur comportant une languette sollicitée élastiquement dans une rainure respective.

12. Appareil suivant la revendication 1, dans lequel des moyens d'arrêt sont prévus pour limiter le déplacement proximal et distal des actionneurs par rapport au corps, les moyens d'arrêt étant propres à empêcher le déplacement de l'extrémité distale de l'aiguille dans le sens distal de l'extrémité distale du stylet.
13. Appareil suivant l'une quelconque des revendications précédentes, dans lequel la longueur de l'aiguille et du stylet est telle qu'en service, l'extrémité distale de l'aiguille couvre la cavité et est proximale par rapport à l'extrémité du stylet lorsque les extrémités proximales des actionneurs sont équidistantes par rapport au corps.
14. Appareil suivant l'une quelconque des revendications précédentes, dans lequel le corps est pourvu d'une poignée (100) qui y est suspendue et est conçue pour amener, en service, le pouce de l'utilisateur dans une position propre à solliciter les actionneurs dans le sens distal.
15. Appareil suivant la revendication 14, dans lequel la poignée est amovible.

Patentansprüche

1. Biopsie-Vorrichtung, die eine röhrenförmige Nadel (18) mit einer distalen Schneidspitze und einen in der Nadel verschiebbaren Mandrin (46), mit einer zur Aufnahme einer Gewebeprobe geeigneten Ausnehmung (66) umfaßt und bei der ein Gehäuse (16) mit zwei manuell bedienbaren, im Gehäuse verschiebbaren Betätigungselementen (22, 48) vorgesehen ist, von denen eines mit der Nadel (18) und eines mit dem Mandrin (46) in Wirkverbindung steht, wobei die Betätigungselemente proximal und die Nadel und der Mandrin distal aus dem Gehäuse ragen.
2. Vorrichtung nach Anspruch 1, bei der zusammenwirkende Anschläge (42 bis 45) zwischen den Betätigungselementen (22, 48) vorgesehen sind, die so gestaltet sind, daß ein Verschieben der Spitze der Nadel (18) distal über die Spitze des Mandrins (46) hinaus verhindert wird.
3. Vorrichtung nach Anspruch 1 oder 2, bei der Anschlagmittel zur Begrenzung einer Verschiebung der Betätigungselemente (22, 48) proxi-

mal vom Gehäuse vorgesehen sind.

4. Vorrichtung nach Anspruch 3, bei der Arretierungsmittel (38, 40; 60, 62) vorgesehen sind, um die Betätigungselemente (22, 48) in der maximalen proximalen Erstreckung lösbar festzuhalten. 5
5. Vorrichtung nach Anspruch 3 oder 4, bei der die maximale proximale Erstreckung der Betätigungselemente (22, 48) gleich ist. 10
6. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der Anschlagmittel (38, 82; 60, 84) zur Begrenzung einer gegenüber dem Gehäuse distalen Verschiebung der Betätigungselemente (22, 48) vorgesehen sind. 15
7. Vorrichtung nach Anspruch 6, bei der die minimale proximale Erstreckung der Betätigungselemente (22, 48) gleich ist. 20
8. Vorrichtung nach einem der Ansprüche 3 bis 7, bei der die Anschlagmittel einen zwischen den Betätigungselementen kooperablen Anschlag umfassen. 25
9. Vorrichtung nach einem der Ansprüche 3 bis 8, bei der die Anschlagmittel einen zwischen einem der Betätigungselemente und dem Gehäuse kooperablen Anschlag umfassen. 30
10. Vorrichtung nach Anspruch 9, bei der das Gehäuse (16) in einer Wand eine axial gerichtete Nut (78) mit proximalen und distalen Endflächen (81, 82) umfaßt und bei der das eine Betätigungselement (22) eine Zunge (36) aufweist, die elastisch in die Nut (78) gedrückt wird und zur Begrenzung einer Verschiebung des einen Betätigungselementes mit einer oder beiden Endflächen in Eingriff kommen kann. 35
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11. Vorrichtung nach Anspruch 10, bei der das Gehäuse gegenüberliegende Nuten (78, 80) aufweist, wobei jedes Betätigungselement eine Zunge besitzt, die in die entsprechende Nut gedrückt wird. 45
12. Vorrichtung nach Anspruch 1, bei der Anschlagmittel zur Begrenzung einer proximalen und distalen Verschiebung der Betätigungselemente gegenüber dem Gehäuse vorgesehen sind, wobei die Anschlagmittel so angeordnet sind, daß eine Verschiebung der distalen Spitze der Nadel distal über die distale Spitze des Mandrins hinaus verhindert wird. 50
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13. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der die Länge der Nadel und des Mandrins derart ist, daß beim Gebrauch das distale Ende der Nadel die Ausnehmung überdeckt und sich proximal der Spitze des Mandrins befindet, wenn die proximalen Enden der Betätigungselemente äquidistant zum Gehäuse sind.
14. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der das Gehäuse mit einem Handgriff (100) versehen ist, der nach unten absteht und so angeordnet ist, daß beim Gebrauch der Daumen des Benutzers in einer Stellung zum Drücken der Betätigungselemente in distaler Richtung ist.
15. Vorrichtung nach Anspruch 14, bei der der Handgriff abnehmbar ist.









